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## NOTICE OF ALLOWANCE AND FEE(S) DUE

23494 7590 09/18/2008

TEXAS INSTRUMENTS INCORPORATED  
P O BOX 655474, M/S 3999  
DALLAS, TX 75265

EXAMINER

ELPENORD, CANDAL

ART UNIT

PAPER NUMBER

2616

DATE MAILED: 09/18/2008

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/729,196	12/05/2003	Gary L. Swoboda	TI-34670	8832

TITLE OF INVENTION: APPARATUS AND METHOD FOR COMPRESSION OF THE TIMING TRACE STREAM

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1440	\$300	\$0	\$1740	12/18/2008

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. **PROSECUTION ON THE MERITS IS CLOSED.** THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN **THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE** OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. **THIS STATUTORY PERIOD CANNOT BE EXTENDED.** SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

## HOW TO REPLY TO THIS NOTICE:

I. Review the SMALL ENTITY status shown above.

If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

A. If the status is the same, pay the TOTAL FEE(S) DUE shown above.

B. If the status above is to be removed, check box 5b on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above, or

If the SMALL ENTITY is shown as NO:

A. Pay TOTAL FEE(S) DUE shown above, or

B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check box 5a on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and 1/2 the ISSUE FEE shown above.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

**IMPORTANT REMINDER:** Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

# **PART B - FEE(S) TRANSMITTAL**

**Complete and send this form, together with applicable fee(s), to:** Mail **Mail Stop ISSUE FEE**  
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**INSTRUCTIONS:** This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

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23494 7590 09/18/2008

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**DALLAS, TX 75265**

## **Certificate of Mailing or Transmission**

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

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10/729,196	12/05/2003	Gary L. Swoboda	TI-34670	8832

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nonprovisional	NO	\$1440	\$300	\$0	\$1740	12/18/2008

EXAMINER	ART UNIT	CLASS-SUBCLASS
ELPENORD, CANDAL	2616	370-503000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

- ☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB-122) attached.  
☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB-47; Rev 03-02 or more recent) attached. Use of a **Customer Number is required.**

2. For printing on the patent front page, list

- (1) the names of up to 3 registered patent attorneys or agents OR, alternatively, 1 \_\_\_\_\_  
 (2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed. 2 \_\_\_\_\_  
 3 \_\_\_\_\_

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

**PLEASE NOTE:** Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

(B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent): ☐ Individual ☐ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:

- ☐ Issue Fee  
☐ Publication Fee (No small entity discount permitted)  
☐ Advance Order - # of Copies \_\_\_\_\_

4b. Payment of Fee(s): (Please first reapply any previously paid issue fee shown above)

- ☐ A check is enclosed.  
☐ Payment by credit card. Form PTO-2038 is attached.  
☐ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number \_\_\_\_\_ (enclose an extra copy of this form).

5. **Change in Entity Status** (from status indicated above)

- ☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27. ☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

**NOTE:** The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature \_\_\_\_\_ Date \_\_\_\_\_  
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This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. **DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.**

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## Determination of Patent Term Adjustment under 35 U.S.C. 154 (b) (application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 762 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 762 day(s).

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (<http://pair.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

**Notice of Allowability****Application No.**

10/729,196

**Applicant(s)**

SWOBODA ET AL.

**Examiner**

CANDAL ELPENORD

**Art Unit**

2616

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--**

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to July 03, 2008.
2. ☒ The allowed claim(s) is/are 11-17.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some\* c) ☐ None of the:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.  
**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.  
(a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached  
1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.  
(b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.  
**Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).**
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO/SB/08),  
Paper No./Mail Date \_\_\_\_\_
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☐ Interview Summary (PTO-413),  
Paper No./Mail Date \_\_\_\_\_
7. ☐ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other \_\_\_\_\_.

### **Reasons For Allowance**

1. The following is an examiner's statement of reasons for allowance:

**Claims 11-17** are allowed.

The present invention is directed toward testing and debugging system comprising of digital signal processing units where a plurality of trace streams are produced by a timing trace stream generator and packet stream generator. Each independent claim uniquely identifies the distinct features.

**Regarding independent claim 11**, a method of compressing a timing trace stream which has a logic signal associated with each clock cycle of a target device, comprising: determining that, during an instance of a preselected number of consecutive clock cycles, at least one logic signal at a first logic level and at least one logic signal at a second logic level are associated with respective ones of said clock cycles, and thereafter transmitting a first number of packets containing logic signals respectively associated with the preselected number of clock cycles; and determining that, during a further instance of said preselected number of consecutive clock cycles, the logic signals associated with the respective clock cycles all have a same logic level, and thereafter, instead of transmitting a corresponding said first number of packets, transmitting a compressed representation of the corresponding said first number of packets, wherein said compressed representation is formatted within a second number of said packets and contains an indication of said same logic level and an indication of said preselected number, and wherein said second number of packets is less than said

first number of packets.

**Regarding independent claim 14**, an apparatus for generating a timing trace stream that is associated with a target processor and includes logic signals respectively associated with clock cycles of the target processor, comprising: an input for receiving said logic signals; logic coupled to said input for providing a first control signal when any two of a preselected consecutive number of said logic signals have respectively different logic levels, and further for providing a second control signal when all of said preselected consecutive number of logic signals have a same logic level; a first storage portion coupled to said input for storing each of said preselected consecutive number of logic signals, said first storage portion coupled to said logic and responsive to said first control signal for transferring the stored logic signals formatted within a first number of packets; and a second storage portion coupled to said input for storing a first representation of said same logic level when all of said preselected consecutive number of logic signals have said same logic level, and said second storage portion further storing a second representation of a multiple of said preselected number, said second storage portion coupled to said logic and responsive to said second control signal for transferring said first and second representations formatted within a second number of said packets that is less than said first number of packets.

**Regarding independent claim 16**, a system for transferring to a host processor information concerning the operation of a target processor, comprising: a program

counter trace stream generation unit configured to generate a trace stream that traces activity of a program counter in the target processor; and a timing trace stream generation unit having first and second modes of operation, said first mode of operation generating timing trace streams for transmission to the host processor, said timing trace streams having logic signals respectively associated with clock cycles of the target processor, wherein a first logic level of the logic signal indicates an activity associated with the program counter during the associated clock cycle and a second logic level of the logic signal indicates an absence of activity associated with the program counter during the associated clock cycle, said second mode of operation generating a compressed timing trace output for transmission to the host processor instead of one of said timing trace streams if said one timing trace stream would have contained only logic signals having a same logic level, said compressed timing trace output including a first representation of said same logic level and a second representation of a number of said logic signals that said one trace timing stream would have contained, and said compressed timing trace output requiring less transmission bandwidth than said one timing trace stream.

The closes prior art of records, Yamamoto '872 discloses a method of compressing a timing trace stream which has a logic signal associated with each clock cycle of a target device (see, "collecting means for generating of trace information and outputting means for outputting series of trace information", col. 5, lines 53-64, fig. 1 to fig. 2, Microcomputer 1 with debugging features, col. 2, lines 52-67, see, associated clock signals with respect to trace stream, col. 7, lines 37-51), comprising: determining

that, during an instance of a preselected number of consecutive clock cycles, at least one logic signal at a first logic level and at least one logic signal at a second logic level are associated with respective ones of said clock cycles (see, associated clock signals with respect to trace stream, col. 7, lines 37-51, col. 9, lines 32-46). Yamamoto '872 further discloses storing means for the storing the output of the trace stream generated in a buffer (col. 14, lines 57-63) as referenced by fig. 4, Buffer 22, 27, and FIFO buffer 29, col. 9, lines 16-28.

McCullough '371 from the same field of endeavor discloses a conventional system and method for recording and transferring trace stream generated (col. 2, lines 22-31). McCullough '371 further discloses a trace analyzer as referenced by fig. 2, trace analyzer 19, col. 4, lines 60-65.

Pauw '879 from the same field of endeavor discloses method and apparatus for tracing a program tasks (fig. 1, Tracing Mechanism 100, paragraphs 0014-0015).

The closest prior arts in combination are silent with respect to the claimed features: and determining that, during a further instance of said preselected number of consecutive clock cycles, the logic signals associated with the respective clock cycles all have a same logic level, and thereafter, instead of transmitting a corresponding said first number of packets, transmitting a compressed representation of the corresponding said first number of packets, wherein said compressed representation is formatted within a second number of said packets and contains an indication of said same logic level and an indication of said preselected number, and wherein said second number of packets is less than said first number of packets.



Therefore, the closest prior arts in combination fail to anticipate or render the distinct independent claimed features obvious.

**Dependent claims 12-13, 15, 17** are allowed since they depend on claims 11, 14, and 16 respectively.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

### ***Conclusion***

2. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Swaine et al (US 7,003,699 B2), Kageshima et al (US 7,093,165 B2), Argarwala et al (US 7,318,176 B2), Swoboda et al (US 6,985,848 B2), Swoboda et al (US 7,325,169 B2), and Kohashi et al (US 2004/0078690 A1).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to CANDAL ELPENORD whose telephone number is (571)270-3123. The examiner can normally be reached on Monday through Friday 7:30AM to 5:00PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kwang Bin Yao can be reached on (571) 272-3182. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Candal Elpenord/  
Examiner, Art Unit 2616

/Kwang B. Yao/  
Supervisory Patent Examiner, Art Unit 2616